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B.Tech Even Semester (CBCS) Exam., May—2018

AGRICULTURAL ENGINEERING

(6th Semester)

Course No. : AE–602 (C)

(Farm Machinery)

Full Marks : 75
Pass Marks : 30

Time : 3 hours

Note :
1. Answer **one** question from each Unit.
2. Begin each answer in a new page.
3. Answer parts of a question at a place.
4. Assume reasonable data, wherever required.
5. The figures in the margin indicate full marks for the questions.

UNIT—I

1. *(a)* Explain in brief different sources of farm power. 5

(b) State advantages and disadvantages of farm mechanization. 5

(c) Define field efficiency and field capacity with examples. 5

2. *(a)* What is farm mechanization? State its limitations. 5

(b) A 3-bottom MB plough when operating at a depth of 20 cm cuts a furrow section of 25 cm top width and 15 cm bottom width. If the total draft requirement for the plough is 20 kN at a speed of 7·2 km/hr, find out unit draft and draw bar power requirement. 10

UNIT—II

3. *(a)* During testing of a 4-row corn planter at 8 km/hr, row spacing maintained at 100 cm and the average turning time at each end is 15 s for either down-the-row speed (assuming the operator throttles down from 8 km/hr to turn). The time required for filling seed hoppers and other miscellaneous interruptions is 4·5 min/ha plus 7% of the effective operating time. Plot curves of field efficiency versus row length from 0·2 km to 1·5 km. 10

(b) Explain calibration of a planter with step-by-step procedure. 5

4. *(a)* Define tillage. What are the functions of primary tillage? 5

(b) Explain different types of MB plough and its use. 10

UNIT—III

5. *(a)* What are disk angle and tilt angle? Explain with sketch. 5

(b) Deduce an expression for offset of a disk harrow. 10

6. *(a)* Explain different types of sprayers used for agricultural and horticultural pest management. 8

(b) Explain trailed, semi-mounted and mounted equipments in detail. 7

UNIT—IV

7. In a reciprocating type mower, the maximum inertia force of 22 kN along the pitman occurs at 35° crank angle and 25° pitman angle with the horizontal plate. The crank radius is 50 mm and the equivalent mass at the crankpin is 2·5 kg. If the crank rotates at 600 r.p.m., what will be the resultant force passing through the crankpin? 15

8. During the testing of a spike-tooth type thresher for wheat crop, the throughput and the thresher capacity were found to be 750 kg h^{1} and 445 kg h^{1}, respectively. The grain-straw ratio (grain : straw) of the crop is 1·5 : 1. Material other than grain (MOG) collected at the main grain outlet is 0·5%. What is the total grain loss in percentage from all the sources? 15

UNIT—V

9. A field sprayer having 16 fan-type spray nozzles spaced 0·5 m apart is moving at a forward speed of 3·5 km h^{1} with an application rate of 1 m^{3} ha^{1}. At a deposition level 430 mm below the tip of the nozzle, what is the discharge rate across a 0·2 m width at the centre? 15

10. Write short notes on the following : 3×5=15

(a) Register and alignment of mower

(b) No-till drill

(c) Inter-cultural tillage

(d) MB plough adjustments

(e) VMD and NMD

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